

CC-5 1.5

"Rite in the Rain."
WEATHERPROOF



LEVEL

NOTEBOOK NO. 311

USEPA SF

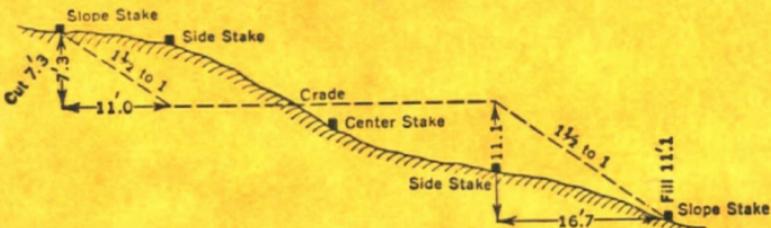


1452408

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1½ to 1.

In the figure below: opposite .7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cutter Fill	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	Cutter Fill
	Distance out from Side or Shoulder Stake										
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

July 8, 1985

1045 - E&E personnel sign site safety
1047 - LC checks conductivity
meter - OK, pH mets check -OK,
HNO₃ phototube check - with span
setting at 8.2 -OK,

1545 - Funnel washed: alcogel
wash, water rinse, and C-free rinse
1600 - R.B. and L.C. drove
to Hospital - Lady of affourelles

Documentation info

Case # 4679

Proj. code # TEC-239A

Acct # TGB 10 PUZZ

Storet #'s 102066-102098

EPA Sample #'s 85281000-85281049

Lab

- Inorganic

Cal Analyte lot

2544 Industrial Blvd
West Sacramento, Ca

95691

Attn: Bonnie McNeill

Louis A Craig

A. Brooks

31

- Organic

Rocky Mountain Analytical
5530 Marshall St.
Arvada, Co 80002
Attn: Ken Zilis

- SAS:

EPA Region 10 Lab

July 9

0720 Rechecked HNU with span
setting at 7.6.

0735 Finished putting acetone and
then methanol on the funnels which
have already been cleaned as described
yesterday

0740 At monitoring well #3, HNU
shows no change from background (1 ppm)
when put into well. Well is 2 inch
PVC pipe with a loose cap on top.
Well depth #3 = 72' 4" (to top of
casing)

39 3/4 inches is the length of
well #3 casing from ground to
top of the casing.

Linda Tracy

31

0800 - RRC - BRS-01

(Bailey Rinse Sample #1) was collected. Bailey + funnel decon procedures; wash with alconox, rinse, then nanopurified acetone and Methanol. The bailey rinse sample used carbon free water for the organics & D-I water for the inorganics which was collected using a bailey and a funnel.

0845: RRC - TP-01 (trip Blank #1) is collected. This includes only 2 VOA bottles.

0905 Began bailering monitoring well #3. Could only get about half a bailey full of water per bailey. After an hour, 5 gallons had been collected from the well.

0015 Stop bailering well # 3.

L. Craig

4)

Well #1

11/15 Top of PVC Casing to Water -
68' 3 3/4"

Ground to Top of Casing -
2' 4 1/2 "

Well #2

Top of PVC Casing to Water
58' 10 1/2 "

Ground to Top of Casing -
1' 8 3/4 "

Well #4

Top of PVC Casing to Water
39' 8 1/2 "

Ground to Top of Casing -
1' 2 1/2 "

Well #5

Top of PVC Casing to Water
53' 8 1/4 "

Ground to Top of Casing
4' 6 1/4 "



G. Brooks

Louis Craig

10:30 Began bailing well #3 again
bailed until 11:15 Only 8 gal. per gal.

11:15 Took pH of well #3,

pH = 7.36. Conductivity is
600 m μ . Salinity = 0.5‰.

Temperature = 24°C.

1150: R.B. begins bailing well
#3.

1225 - begin taking samples of
well #3.

1300 Finished collecting W-3
sample

R.B. contacted Paula at
SMD & gave her shipping info
for today's samples. Also

1405 contacted Joyce C. at EPA
to inform her of the samples
to be shipped today.

Distinguished Samples #

PRO-BRS-01 and PRO-W3
to Jerry Dutcher.

Each sample consist of
1-liter Poly bottle & 1-liter
Amber bottle

G. Brooks Louis Craig

July 10, 1985

6/

- 0710 Arrived at site
0840 Collected RRC-TP-02
0845 Calibrated HNU-set
Span at 7.7 for 59
ppm calibration gas
(9.8 span); 2 50/ln
calibration for pH
meter - OK; 1 50/ln
calibration for conc.
meter - 1300 mAhos for
1100 mAhos 50/ln.
- 0915 Well #1
HNU-BKGD 0.4 ppm;
Breathing Zone & Headspace
is the same as BKGD
Water level from the
Top of the Casing is
68' 4 3/4"
Depth to the bottom of
the well is ~ 98' 80"
- 0925 Commenced purging well
with PVC bailed
1020 Completed Purging 16 gallons

A. Brooks

71

July 10, 1985 (Cont.)
from Well #1

- 1035 Commenced Collection
Sample from Well #1
- 1120 Finished Sampling W#2
Temp 24°C
Cond. - 620
pH - 7.18
- 1142 Well #2
HNU Reading for Breath-
ing Zone & Headspace is
the same as BLEGD-0.5 ppm
Top of Casing to water
is 58' 10³/₄" R.B.
Depth of Well from Top
of Casing is 83' 10³/₄"
- 1200 Commenced pumping
well #2 with PVC bailer
- 1300 Finished bailering 16 gallons
from Well #2
- 1305 Commenced Sampling Well
#2 w/ PVC bailed
- 1340 Completed Sampling W#2
Conductivity = 650
temperature = 24°C
pH = 7.14 -
R. Bracke L. Gray

July 10, 1985 cont. 8/

- 1300 Joyce Crosser told L.C. to use the EPA pesticide form(water) for the soil samples also. Alter the form accordingly.
- 1605 Samples delivered to Fed Express.

Louis Craig
7/14/85

July 11, 1985

91

- 0710 Arrived on the site
0740 Calibrated Field instruments
HNU - Set span at 7.7 for
59 ppm gas (9.8 span).
pH meter - 150mL Calibration
OK • Cond. meter - 150mL
Calibration - 1250 umhos
for 1100 umhos 50mL.
Well #4
0815 HNU - breathing zone &
headspace is the same
as blank. - 0.2 ppm
Top of Casing to water -
39' 8 1/4"
Depth of Well From Top
of the Casing - 60' 7 1/4"
0835 Commenced purging Well #4
with PVC bailed
0857 Completed Purging 16 gallons
from Well #4
0910 Started Sampling W#4 w/
PVC bailed
0935 Completed Sampling W#4
R. Brooks

10/

July 11, 1985 (Cont.)
0945 Well #4, pH 7.79
Conductivity = 600
Temp. = 24°C
Well #5

- 1015 Detach cut PVC
casing. Top to casing
to ground is now 2 1/2"
- 1030 HWU Reading for the
breathing zone and
headspace is the same
as BK60 - 0.4 ppm.
- 1036 Top of Casing - 51' 2 3/4"
Depth of well from R.B.
Top of Casing - 72 1/2'
70' 2 1/2"
- 1045 Commenced purging w/
PVC bailed
- 1120 Completed purging 16 gals.
Water contains more
silt than noted in the
other wells sampled
- 1130 Started Sampling w/PVC
bailee.
- 1155 Completed Sampling.
R. Brooks

11

July 11, 1985 (Cont.)

1110 Begin taking samples from RRC-DWW (the drinking water well). Dietrich says approximately 15,000 gallons were pumped out of the well this morning. Took sample from faucet straight out of well.

1116 finish sample RRC-DWW
pH = 7.97 Depth of well =
Temp = 22° 98' 6"
Conduc. = 550 Depth to water?
1215 Info for well #5
Conductivity = 600
pH = 7.98, Temp = 25°C

~~Louis Craig~~
7/11/85

July 12, 1985

No sampler shipped

July 13, 1985

No samples shipped

July 14, 1985

Non work day

July 15, 1985

0815 Arrived at the site.

Sample lab # assignments

#85281009	EE-1	30-gw.
-----07	EE-1	10-20 ft.
- - - - 08	EE-1	10-30 ft.
- - - - 13	EE-8	30-gw.
- - - - 12	EE-8	10-30
- - - - 11	EE-2	30-gw
- - - - 10	EE-2	10-30 ft.
— 15	EE-9	30-gw.
~ 14	EE-9	10-30 ft.
~ 16	EE-6	10-30 ft
~ 17	EE-6	30-gw.
18	EE-7	10-30
19	EE-7	30-gw
20	EE-3	10-30
21	EE-3	30-gw
22	EE-4	10-20
23	EE-4	20-gw

all these are
La Saj

Sample lab # continued

#	well no.	deptt	Medic
85281024	EE-5	10-20	Soil
- - - 25	EE-5	20-gw	Soil
- - - 26	EE-1	grab	Water
- - - 27	EE-2	"	"
- - - 28	EE-3	"	"
- - - 29	EE-4	"	"
- - - 30	EE-5	"	"
- - - 31	EE-6	"	"
- - - 32	EE-7	"	"
- - - 33	EE-8	"	"
- - - 34	EE-9	"	"

Town & Hay

July 16, 1985
0550 Arrived at Site
HNU calibrated - works fine
lot #'s used for water
(in previous water samples last week)
poly bottles → 3515 7312
1-liter amber → 8517 2222
VOA → 24292122

For each water sample, needed are:
1 amber, 2 vials, 2 poly.

7-17-85
1000 Labelling bottles for EE-5

EPA ~~#~~ # 5?

<u>#</u>	<u>well no.</u>	<u>Depth</u>	<u>media</u>
85281035	EE-5	10-20'	SOIL
85281036	EE-5	20-60'	SOIL

Check with J. Whidden to see if
above nos. cancel out
previous nos. -

Info on today's sampling of
EE-Well #5: Began Drilling hole
at 12:45 and ended at 1615
- Water depth is about 44 feet

July 19, 1985

Well # EE-5

Water table at 60 ft.

0700 - 0730 10-20 ft

0730 - 0800 10-30

800 - 830 30-40

830 - 900 40-50

900 - 930 50-60

July 20, 1985

HNU span 7.8 and
checks out OK. at 59 ppm

July 22, 1985

1420 begin Sampling Well EE-

#4 - Bill Carberry - sampler

pH = 7.23, Temp = 26 °C

Cond = 600 ppm - There is a

slight oily film on top of the sample.

- trip blank # or RRC-TP-

O₂ is sent today

For Well EE-05 - pH 7.41

and 18 °C, Cond. = 700 ppm

Sampling began 1510 ended at 1530

→ Samples miss fed. Epp for
tomorrow arrival

~~Carberry~~

0705

July 23.
TNU is calibrated w/
Span sett at 7.8.

0928

July 31
The water level from top
of casing for well
is 73' 2". Bottom of well
to top of Casing is 99' 2".

0953 Well development begins —

1030 One stainless steel bucket filled

1058 2d bucket filled

1120 3d " "

1137. 4th " "

Water still dirty . . .

Louisian

Aug 1, 1985

0715

Arrived at site

Bailed a total of 7 buckets
or 7×3.5 gallons = 24.5 gallons
out of well EE-9. The water
remained silty & brown.

1130

Commenced Sampling water
in EE-8

pH = 7.80, 17°C, and
conductivity = 490 m μ

1215

Sampling EE-8 completed

1400

Sampling of EE-9 commencing
The sample lab nos. for
(EE-8) & (EE-9) are listed as
85310390 and 85310391
respectively

EE-9 → 85310390

EE-8 → 85310391

Temp = 18°, pH = 8.04,
Cond 550 m μ for
well # EE-9

1430 Sampling completed

1615 Samples are delivered to
Federal Express for water

sampling of wells EE-8 and
EE-9 and a VOA trip blank
was included in RRC-TP-05.

Louis Allay

Aug 2, 1985

0630 Arrive on site

1600 Dropped soil samples off at Federal Express. Samples sent were all soil samples collected to date including soil collected at control well today. One cooler was sent with samples going to EPA lab. Not enough pens were given to collect soil for the interval 10-20 feet on the EE-1 well, so no 10-20 foot samples were collected.

1645 Left site

Sample lab nos.
week of 14 July - 20 ;

85290825 to and including
85290849

For week 21 July - 27 ;

85300850 -
85300874

Aug 3 Sat.

0710 Arrived site

0830 began bailer (B.C.)

the well EE-1, R.H.

bailer well EE-6.

0815 R.H. began bailing

1030 R.H. ends bailing -

24.5 gallons perged with
water still silty,

1045 B.C. ends perching well

EE-1 - perged 31.5 gallons Total

the background well

EE-1 is 75' 11" away

from the JUB control well

and 113° from JUB well
(E. SE).

1430 Drillers finishes decom &
move drill over EE-3

1452 HNU check w/ 59 ppm at
Span setting at 7.8 - OK.

1500 Began drilling hole # EE-3

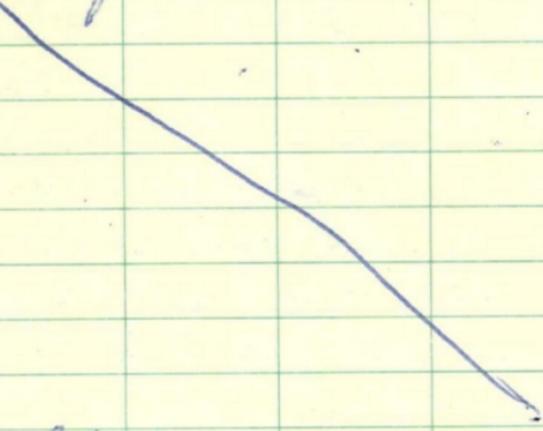
1530 Borehole opening with
tip of auger at about 6 ft gave
HNU reading gave a fairly
steady 100-200 ppm reading.



Breath area had "O" ready until augers were locked out and a 0-50 ready occurred with ready more toward 50 side. Soil shoveled into drums was initially found to be 50-100 ppm, but after a period of 20 minutes it reduced to zero.

1600 Shut down the site for the day

1630 left site



Later in evening, B.C. & L.C. drove to Richland to rent two fans for air control at the hole,

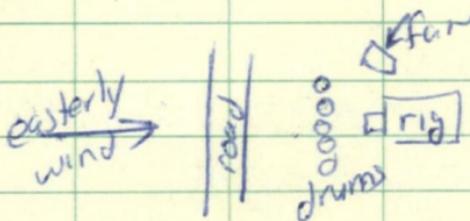
Aug 4 Sun.

- 0600 Arrive onsite
0650 Drilling continues again
(Auger already at 7 feet)
P.C. monitored the air
with a checked out HNU
and found 5-20 ppm in
breath zone and 50+ ppm
in the auger hole. One
fan is being used at ground
level. With the fan
0-5 ppm is reading in
breath zone; 5-20 is
reading in barrel with fresh
cuttings; 100+ (to 500)
is reading in borehole.
All personnel working near the
drill rig are wearing ultratwir
or the Racal positive pressure
units: 3 Racals function &
2 ultratwirs in use.
- 0730 Isolated bolts of lightning
have been seen in the distance
over the past hour. The
storm area now is in the
Columbia Valley area.

0740 Lightning in immediate vicinity
So we shut down site.

0755 We all leave site

On shutting down wind
was in a easterly direction
while initially it was in
a westerly direction. Up
wind the HANU read zero.



Between cuttings drum and rig
the workzone air was 1-3 ppm.

At borehole opening and on
downwind side air reading
was 50-200 ppm. Air

immediately above dixie cups
with lithologic soil samples

~~was~~ was ① 5-10 ppm. ~~at~~

Mouth of drum w/ drill
cuttings was ① 50-100 ppm.

~~Handwritten Signature~~

Aug 4 continued

- 0900 Return to site
- 0935 Drilling begins again - level C.
- 1000 HNU - 1 ppm breath zone
and up to 20 ppm in barrelled cuttings
- 1005 50 foot level is reached.
Breath zone is same as background and soil coming up is up to 5 ppm. The HNU readings are dropping considerably at this depth.
- 1014 57 feet reached and we're near reaching water.
HNU readings are increasing
5-20 ppm in sand borings.
- 1024 HNU readings at 62 feet:
borehole soils at 30-150 ppm
waist high Breath zone 3-5 ppm
shoulder high Breath zone 0-1 ppm
Background is zero.
- 1033 67 feet sand flowing into auger so water is above this, HNU readings are same as before
- 1042 72 foot reading: 10-30 ppm sand bottom
waist high 0-1 ppm
background & ~~wrist~~ shoulder: 0 ppm

1050 Fan is taken down since
the breeze is strong now
from the SE.

1130 Down grade to level D
since breathy zone has
been zero or HNU for
awhile.

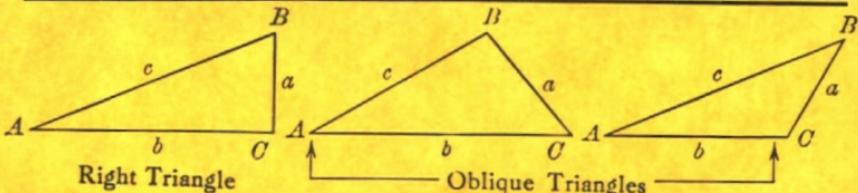
1235 Upgraded to level C proto.
the soil coming from the
auger reads up to 500 ppm
now. When the dirt is
shovelled slowly, the breathy
zone HNU reading is kept
from 2-5 ppm. Background is
zero. Drillers are continuing to
work but more carefully to
keep breathy area in acceptable
ppm.

1305 Breathy-zone: 1-2 ppm

1511 Continue work after lunch
break. The breathy zone
right around the auger opening is
1-5 ppm with occasional spikes
to 15 ppm.

1725 Leave site

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

For Angle A . $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

Given	Required	
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B, c = \sqrt{a^2 + b^2} = a \sqrt{1 + \frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B, b = \sqrt{(c+a)(c-a)} = c \sqrt{1 - \frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90^\circ - A, b = a \cot A, c = \frac{a}{\sin A}$.
A, b	B, a, c	$B = 90^\circ - A, a = b \tan A, c = \frac{b}{\cos A}$.
A, c	B, a, b	$B = 90^\circ - A, a = c \sin A, b = c \cos A$,

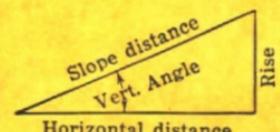
Solution of Oblique Triangles

Given	Required	
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A}, C = 180^\circ - (A + B), c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a}, C = 180^\circ - (A + B), c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180^\circ - C, \tan \frac{1}{2}(A-B) = \frac{(a-b)\tan \frac{1}{2}(A+B)}{a+b},$ $c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a+b+c}{2}, \sin \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{bc}},$ $\sin \frac{1}{2}B = \sqrt{\frac{(s-a)(s-c)}{ac}}, C = 180^\circ - (A+B)$
a, b, c	Area	$s = \frac{a+b+c}{2}, \text{area} = \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	$\text{area} = \frac{b c \sin A}{2}$
A, B, C, a	Area	$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL

Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle = $5^\circ 10'$. From Table, Page IX. $\cos 5^\circ 10' = .9959$. Horizontal distance = $319.4 \times .9959 = 318.09$ ft.

Horizontal distance also = Slope distance minus slope distance times (1 - cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. $\text{Cosine } 5^\circ 10' = .9959. 1 - .9959 = .0041$. $319.4 \times .0041 = 1.31$. $319.4 - 1.31 = 318.09$ ft.



When the rise is known, the horizontal distance is approximately:—the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft., slope distance = 302.6 ft. Horizontal distance = $302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.

1'10

75

22

73'2"

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